

Lamprey River Management Plan

2007 Update



Statement of Management Philosophy

The philosophy behind this Management Plan Update is based on two realizations: first, that the Lamprey River corridor is facing increasing pressure from development and recreational use as population grows; and second, that management of the river must strike a balance among protecting the river as an ecosystem, maintaining legitimate community uses, and respecting the interests and property rights of those who own its shorelands.

It is the firm belief of the Lamprey River Advisory Committee (LRAC) that individual actions are the key to river protection. This belief has been distilled into our unifying theme, “TREAD LIGHTLY.”

The theme relates to many aspects of river management. We hope that by “treading lightly,” people will enjoy a river that is characterized by appropriate recreational activities, natural scenic beauty, clean water, an abundance of fish and wildlife species, and protected historical and archaeological sites. We believe that the Lamprey can be simultaneously protected and utilized if landowners, town boards, recreationists, and the state and federal governments are well informed about its unique attributes and work to safeguard them.

Notwithstanding the protection afforded by the NH Rivers Program, local, state and federal regulatory programs, and the federal Wild and Scenic Rivers program, the Lamprey’s future as a community asset rests most squarely on the willingness of individuals and the towns along the river to be careful stewards of it. Mindful of this reality, LRAC seeks partners, both organizations and individuals, to assist it in protecting the river and its resources.

Cover painting: *Fall Along the Lamprey*, by John W. Hatch

Lamprey River Management Plan 2007 Update

Prepared by
the Lamprey River Advisory Committee
November 2007

Newmarket:

Fred Pearson
Ellen Snyder
Sara Callaghan*

Lee:

Sharon Meeker*
Kitty Miller*
Frank Reinhold, Jr.

Durham:

Cynthia Belowski*
Jim Hewitt*
Richard Kelley*
Dick Lord*
Bill Hall*
Judith Spang

Epping:

Kevin Martin, Chair*

Member at Large:

Brian Giles*

* Denotes November 2007 members

Table of Contents

Executive Summary	i
Background	1
Water Quality	5
Instream Flow	11
Wildlife and Ecology	16
Land Protection	21
History and Archaeology	26
Recreation	29
Project Review and Comment	32
Outreach and Public Education.....	35
Definitions.....	39
Programs and Abbreviations.....	39
Bibliography	40

Executive Summary

This 2007 update of the 1995 *Lamprey River Management Plan* reflects changes in the river and its watershed, but also a deepening understanding and level of involvement with on-going river issues on the part of the Lamprey River Advisory Committee (LRAC).

Perhaps the biggest event since the writing of the 1995 plan has been the federal designation of the river as Wild and Scenic. In 1990, the section of the Lamprey which runs through Lee and Durham had been added to the NH Rivers Management and Protection Program. In 1996, Congress designated an 11.5 mile segment of the Lamprey River in Lee, Durham, and part of Newmarket under the Wild and Scenic River program. This was followed in 2000 with the addition of 12 miles in Epping. Other major changes in the watershed in the past decade have included a new, greatly improved wastewater treatment plant in Epping; over a thousand acres of river corridor land permanently conserved; many new residences built or planned in Lamprey towns; and the paradox of severe floods that caused property damage, and droughts that challenged public water suppliers to meet the demands of their users while leaving enough water to preserve the river's habitat. Organizationally, both the LRAC and its member towns have established more extensive and sophisticated working relationships with other organizations to help realize watershed-related goals.

The LRAC has concentrated efforts in four main areas in the past decade.

- Addressing challenges in the watershed resulting from development of river corridor lands, which can result in the loss of wildlife habitat, degradation of water quality, and negative impacts on the river's natural and scenic qualities.
- A multi-pronged initiative to encourage and inform landowners on being good stewards of their properties to protect the river and associated habitats.
- Cultivating awareness and appreciation for the Lamprey River through educational programs and materials for schools and the general public, and creating public riverfront areas that provide both recreational access and information about the river.
- Promoting the ecological health of the river by working with governmental agencies, the University of New Hampshire, and others to research wildlife presence and movement, to provide for fish and wildlife passage, and to encourage municipal water use policies that will yield a sustainable amount of water for aquatic and riparian life.

This update is divided into eight sections that highlight accomplishments, goals, and key actions for the next 10 years, as follows.

Water Quality

Diligent monitoring and safeguarding of the Lamprey's water quality will always be a priority. The LRAC will continue its role as a watchdog, tracking the results of water quality monitoring being conducted by various groups, and reviewing and commenting upon development proposals to avoid or minimize degradation of the river.

The committee now plans to undertake work with towns and the NH Department of Environmental Services to prevent runoff from carrying silt and pollutants into the river, whether from stormwater runoff or erosion at construction sites. It will continue to be important to inform owners of riverfront land on ways to prevent erosion and pollutants from reaching the river.

Instream Flow

Like other southern New Hampshire rivers, the Lamprey River is subject to extremely low flows during droughts. It is also seen as a major water resource by watershed towns. The UNH/Durham water system has been the largest consumptive user of the Lamprey, but in the future, it is anticipated that the river will be eyed as a water supply by other towns and businesses in and out of the watershed. Meeting the needs of aquatic plants and animals while addressing the growing human population is going to be increasingly challenging in the near future.

The Lamprey was selected by the DES for a pilot Instream Flow study on how to maintain adequate levels of water in the river while providing for human use. The LRAC has members on both the Technical Review Committee and Watershed Management Planning Advisory Committee of the Instream Flow pilot study.

Throughout the Instream Flow study and beyond, LRAC members will be working closely with the DES, Durham, UNH, and other river towns to encourage water conservation, balancing the use of groundwater and river water for water supply so that neither is overtaxed, and other good water resource management. Such cooperation will help to assure that withdrawals of water from the Lamprey will not degrade water quality, legitimate riverfront landowner uses of the river, nor its ecology.

Wildlife and Ecology

The Lamprey River has maintained most of the healthy, diverse habitat types that made it eligible for protection under both the state and national river programs over a decade ago. In the next decade, the LRAC will continue to work to maintain this unspoiled natural ecosystem through land conservation, careful review of development proposals, measures to control invasive species, restoration of fish passage around the Wiswall dam, and assuring adequate water levels in the river. These efforts will extend to encouraging member towns to establish standards that protect the river's habitats and water quality and continuing to inform landowners on how to maintain the Lamprey's value to a wide variety of plants and animals.

Ecological research commissioned by the LRAC has helped to track the health of the river and identify important lands for permanent protection. Future efforts will include follow-ups to this research, as well as studies of other plant and animal species, their habitats, and new geographical areas. Research findings from studies conducted by LRAC and others will be mapped to facilitate ecological management in the watershed.

Land Protection

Partnering with towns, land trusts and other organizations, the LRAC has participated in the conservation of 20 properties totaling 1,072 acres and 7 ½ miles of river frontage. This will continue to be a key focus of the committee's work. Because of ecological research done in the past decade, the LRAC now has an even better understanding of which lands are most critical for protecting wildlife on the Lamprey.

In the next five years, the LRAC will undertake new work with town conservation commissions and other organizations to support their conservation efforts, extending information to residents and riverfront landowners on why and how to protect the Lamprey River corridor for the future.

History and Archaeology

The LRAC believes that a community's sense of place depends in part upon knowledge of its history, especially when historical sites and documents can be enjoyed first-hand. In 1999, the LRAC researched and produced a videotape on the history of the river that revealed many sites of historical and archaeological significance in each watershed town.

The LRAC will continue to conduct further research and documentation of these areas, including funding professional work and collecting and preserving important documents. The goal will be to address one historical/archaeological feature in each town and where appropriate, develop access and on-site information for the public. Landowners will also be informed on how to find and protect historical sites and artifacts on their properties.

Recreation

Until recently, aside from the LRAC's development of public parks at Wiswall dam and Epping's Route 87 bridge, there have been no efforts to create recreational opportunities on the Lamprey. Some areas are inaccessible and others are overused. The LRAC plans to proceed cautiously so recreational use will reflect its "Tread Lightly" philosophy toward providing for public enjoyment that does not degrade the river.

To this end, National Park Service Rivers and Trails staff will help the LRAC and towns develop the Lamprey's first multi-town Recreational Tour, including implementation of first phase recreational facilities. This will enable towns, property owners and others to work cooperatively to develop more opportunities for boating, fishing, swimming, walking, wildlife viewing and other activities.

Project Review

The LRAC is charged with reviewing all projects requiring a state or federal permit that could impact the Lamprey River. With members from each of the four towns, it also closely follows river-related local issues such as proposed developments or changes in regulations.

In many instances, this will lead in the future, as it has in the past, to a cooperative effort among the town, the developer and state and federal regulatory agencies that results in improvements to projects, making them more protective of the river and its corridor.

Outreach and Public Education

The LRAC strives to “speak for the river” and to help others to become its advocates as well. In the past decade this has included work with schools in the watershed, creating public informational brochures, posting signs at river crossings, conducting workshops, and bringing displays to various public events.

In the coming years, this important work will continue with events, materials, building kiosks at recreational or public vista points, workshops and electronic media to convey the LRAC’s goals and information about the river and to generate public participation in activities to promote enjoyment and protection of the Lamprey.



Permission for use granted by David Carrol for inclusion in the Lamprey River Management Plan.

Background



In 2000, this ribbon-cutting marked the addition of the Epping segment of the Lamprey River to the Wild and Scenic River designation. *Photo by Richard H. Lord.*¹

The Lamprey River Advisory Committee

The Lamprey River Advisory Committee, is the group mandated by both the New Hampshire Rivers Management and Protection Program and the federal Wild and Scenic Rivers program to participate in the management of the designated sections of the Lamprey River. There is at least one committee member from each of the four towns within the Wild and Scenic River designation (Epping, Lee, Durham and Newmarket). Those members are nominated by the governments of those towns and then are appointed by the commissioner of the New Hampshire Department of Environmental Services for a three year term. There are a minimum of seven members on the committee, all serving as volunteers, representing the interests of local government, business, agriculture, conservation interests, recreation, and riparian

¹ All photos in this document are available in color in the Management Plan document at www.lampreyriver.org

landowners. LRAC is distinct from the Lamprey River Watershed Association (LRWA), a nonprofit membership group, operating throughout the watershed. The two organizations often collaborate in efforts to enhance protection of the Lamprey.

The first responsibility of the LRAC was to write and then implement a management plan for the river, in cooperation with the member towns.

Designations

Portions of the Lamprey River were designated for special protection by both the State of New Hampshire and the U.S. Congress, through the NH Rivers Management and Protection Program and the National Wild and Scenic Rivers Act, respectively (see following maps for detail).

Thanks to the efforts of local citizens devoted to the Lamprey River who documented its outstanding natural and cultural resources and brought it forward to the State, in 1990 the river in Durham and Lee was protected under the New Hampshire Rivers Management and Protection Program. Then, in 1996, the river through Lee, Durham and Newmarket (to the confluence with the Piscassic River) was federally designated as a Wild and Scenic River. In 2000, the river segment in Epping, from the West Epping Dam to Lee, was added. In 2003, a nomination was submitted to DES to approve adding the Lamprey in Candia and Raymond into the state program, and there is also interest in extending Wild and Scenic designation to upstream towns. With sufficient public support, and with the assistance of LRWA and LRAC, these initiatives may move forward.

1. New Hampshire Rivers Management and Protection Program

The New Hampshire Rivers Management and Protection Program (RMPP) was enacted in 1988 to protect the state's most significant rivers or river segments. In 1990, the section of the Lamprey River which runs through Lee and Durham was among the first rivers nominated into the RMPP. The Lamprey was designated as a "Rural River." The RMPP provides for the establishment of a local advisory committee on each designated river to implement river management and protection policies at the local level.

The Lamprey River Advisory Committee serves as the local advisory committee on the Lamprey. LRAC's responsibilities are to:

- Develop and implement a Management Plan for the river, approved by the member towns; and
- Advise the New Hampshire Department of Environmental Services and municipalities on matters pertaining to the river; including review and comment on any development projects or state, federal, or local permits affecting the river.

The State assumes responsibility for assisting the local advisory committee and provides the following protections for the Lamprey:

- A prohibition against the construction of new dams, the use of flashboards on existing dams, and interbasin transfer of water from the Lamprey River.
- Protection of water quality and maintenance of adequate year-round flows in the river to support a full range of natural resource needs and also human uses.
- Mandatory setbacks for new solid and hazardous waste facilities.

Otherwise, the state program does not regulate local zoning or confer special regulatory powers to state agencies relative to Protected Rivers.

2. Designation Under the Wild and Scenic Rivers Act

The broad purposes of national designation of a river as a Wild and Scenic River are to:

- Establish federal policies for the watercourse which ensure that federal actions are consistent with protecting the resources for which the river was designated.
- Provide for financial and technical assistance from the National Park Service in implementing the River Management Plan.

In contrast to most of the 160 rivers in the National Wild and Scenic Rivers System that flow through federally-owned land, and are managed by the federal agency that manages the land, many of the designated rivers in the East flow through private lands. These rivers, including the Lamprey, are called “Partnership Wild and Scenic Rivers” because their management occurs through a partnership of the National Park Service and a local river management advisory committee. According to Jamie Fosburgh of the National Park Service, Partnership Wild and Scenic Rivers share the following characteristics:

- No lands are federally owned.
- Administration is accomplished through a broadly participatory committee.
- Management and use of lands adjacent to the river continue to be the responsibility of landowners subject only to existing state and local regulations.
- The River Management Plan is written and implemented through a broadly participatory process.
- The National Park Service reviews federally funded, sponsored, or licensed projects to ensure federal consistency with the plan’s river protection goals.
- The costs and responsibilities for managing and protecting the river’s resources are shared among all of the partners—local, state, federal, and non-governmental.

The 1995 *Lamprey River Management Plan* was developed as a part of the National Wild and Scenic River Study of the Lamprey. The plan included specific provisions related to Wild and Scenic designation, all of which are carried forward in this update. These provisions, together with the National Park Service's June 1995 *Draft Report to Congress*, and the text of federal legislation in 1999 and 2001 designating the portions of the Lamprey into the federal system, provide the full background and context for the National Wild and Scenic River designation of the Lamprey.

Twenty-three and a half miles of the Lamprey River are designated as a Wild and Scenic River, from the West Epping Dam in Epping to the confluence with the Piscassic River in Newmarket. The area of oversight is approximately one-quarter mile each side of the river.

Immediately following this section, the reader will find two maps. The "locus map" shows the entire Lamprey River watershed from its headwaters to its discharge into Great Bay. The "base map" focuses on the designated Wild and Scenic River segment in the towns of Epping, Lee, Durham and Newmarket.

The following eight sections comprise the details of the plan, including accomplishments, goals, and key future actions. The plan is deliberately ambitious, representing a full menu of initiatives seen as desirable, rather than a commitment to accomplishing all in the next decade. In many instances, successful collaboration will be essential to the accomplishment of the plan's identified actions and goals. LRAC often will play a supporting role to others who possess the necessary expertise, staff, authority, or resources to get a particular job done.

Water Quality



Siltation into the Lamprey River after a storm event. *Photo by Richard H. Lord.*

Background

Clean water in the Lamprey River is central to LRAC's vision for the river corridor. In diverse ways, many of the LRAC's efforts are aimed at maintaining and/or improving the river's current high quality of water.

With the support of the LRAC, the Lamprey River Watershed Association (LRWA) assisted by the New Hampshire State Volunteer River Assessment Program (VRAP), has conducted water quality monitoring over the past six years. Studies have also been done by UNH and DES. Recently, the LRWA monitoring has been extended the length of the entire river.

The Lamprey is legislatively classified as a Class B (see "Definitions," pg. 34) river, and is thus managed by the DES under the federal Clean Water Act to maintain "fishable and swimmable" conditions. Water quality generally remains high thanks in part to the new sewage treatment plant in Epping, a significant amount of land protection, local municipal zoning ordinances that protect shorelands, and good land management by property owners. Since the Lamprey River is a source of municipal drinking water, high quality is critical to all who live in its vicinity.

Despite these efforts, problems with water quality still exist, and are the result of several factors, each of which is addressed in this plan.

First, the rapid runoff of stormwater not only erodes the banks and causes siltation (see photo on preceding page), but can also carry with it agricultural waste, chemicals applied to lawns, and salt, sand and automotive pollutants washed off driveways, roads and bridges. Land uses with predominantly pervious surfaces, where water can soak into the ground rather than running off pavement or rooftops, greatly reduce stormwater-related problems. Another problem with rapid runoff is the adverse effect on the river's flow during dry periods. Runoff results in less infiltration into the soil, creating less groundwater to infiltrate into streams and the river. Yet another problem is that a major contributor to rapid runoff, impervious surfaces, such as pavement and roofs, can substantially increase the river's temperature. For all these reasons, stormwater management will be a focus for the LRAC, working in cooperation with others, in the coming years.

Secondly, lack of a vegetated buffer along the river means soils are not stabilized or protected from the impact of rain, and nutrients can be carried readily into the water, rather than being absorbed by plants and the soil. Shoreland vegetation also shades the water, maintaining cooler temperatures critical to aquatic life. Buffers can be protected by state and local regulation and by land management practices by informed landowners.

Finally, low river flows, especially during extreme drought, concentrate nutrients and warm the water, causing excessive algae growth. On occasion, this has caused dissolved oxygen levels in the Lamprey to drop below standards for a Class B river. Also exacerbated by low flows are the concentrations of copper and zinc, which have on occasion, and in certain locations, reached levels considered harmful to aquatic and riparian life of the Lamprey. The LRAC is thus engaged in work to study ways to understand and protect the Lamprey's instream flows.

Maintaining high water quality depends on constant monitoring, review of potentially polluting developments on shore, education of landowners (both public and private) and a readiness to work with local, state and federal regulators to prevent and address problems as they arise.

Accomplishments

- Created brochures for landowners explaining why and how to manage riverfront lands for good water quality and wildlife habitat.
- In partnership with the Oyster River Watershed Association, Strafford Regional Planning Commission, and Strafford County Conservation

District, held a series of workshops on maintaining vegetated buffers to protect the river.

- Reviewed and commented on proposed state and private development projects to assure water quality would not be degraded.
- Testified at hearings regarding upgrades to the state's shoreland protection statute.

Goal

- A high quality of water in the Lamprey River, consistently achieving or exceeding Class B standards (see "Definitions," pg. 34), for the health and enjoyment of all species.

Key Future Actions

- Identify and address stormwater issues in all four towns.
 - Consult the *Stream Buffer Characterization* maps, prepared by UNH and the NH Estuaries Project, which show where impervious surfaces are not adequately buffered by a 300 foot vegetated strip along the Lamprey and its tributaries, and consider remedial action.
 - Partner with municipalities, developers, the State and other organizations to promote the minimization of run-off from roads, parking lots, roofs, and driveways.
 - Minimize the increase of impervious surfaces by influencing local and state regulations.
 - Encourage local boards to require developers to use low impact design and construction methods to minimize run-off.
 - Work with the NH Department of Transportation and municipal public works departments to build and maintain roads and bridges in a way that will protect the river from salting, sanding, erosion and run-off of automobile-related pollutants.
- Keep current on the performance of existing wastewater treatment facilities to assure the continued protection of water quality.
- Encourage towns to consider the impacts on the capacity of wastewater treatment facilities when reviewing development proposals.
- Work with the state commission that is studying alternative wastewater treatment and disposal methods for 42 coastal communities.

- Encourage consistent zoning in all four towns that promotes good water quality.
 - Track changes in zoning ordinances in the towns along the river and include the information in LRAC's outreach publications.
 - In fulfilling the LRAC's permit review function, help towns to assess development proposals relative to their effect on water quality.
 - Develop protocols with the municipalities and state and federal agencies to assure that the LRAC will be notified as early as possible of development proposals that could affect the Lamprey and its corridor.
- Support the water quality monitoring work of LRWA.
- Maintain the ability of floodplains and wetlands to efficiently absorb water and protect the river from run-off related pollution.
 - Assess floodplain and wetland mapping for the Lamprey corridor and determine ways to improve it, coordinating with state and federal agencies.
 - Work with town boards to inform them of the importance of floodplains for floodwater storage and to encourage protection of floodplains and wetlands when considering development proposals.
 - Educate ourselves, citizens and town officials regarding available model regulations for protecting floodplains.
- Continue to monitor erosion and seek solutions.
 - Identify and map erosion areas in the riparian buffers, floodplains and river banks, using existing information and an on-site inventory.
 - Develop and implement a plan to correct erosion problems, focusing initially on erosion due to heavy recreational foot traffic.
 - Address the issue of illegal all-terrain vehicle use in the Lamprey corridor, and in the river itself, that causes erosion and degrades habitat.
 - Plan for recreational access that prevents erosion, including encouragement of the Department of Fish and Game to promote the dispersal of fishing into more areas in order to reduce erosion from over-use of existing ones.
 - Conduct a program in concert with local nurseries, developers, the County Conservation Districts, Natural Resource Conservation Service, and other partners to encourage:
 - Planting of native riparian vegetation by landowners to prevent erosion and runoff of pollutants.

- Restoration of eroded areas through collaborative funding.
 - Protection of restored areas with signage and creation of alternate access points.
- Investigate and eliminate sources of pollutants that have caused some sections of the river to be classified as “impaired” by DES.
 - Continue to support and participate in water quality monitoring through the LRWA.
 - In cooperation with LRWA, explore the benefits of using DES’s Assessment Unit (river segment) methodology on the Lamprey to determine whether DES testing should extend to every individual segment to see if it is meeting its water quality goals.
 - Combine water quality data from all the various monitoring efforts being conducted on the river into a five-year report.
 - In partnership with the Lamprey River Watershed Association, UNH and DES, determine the benefits of a study to examine the areas identified as impaired by heavy metals, bacteria, high nutrient levels, or low dissolved oxygen, and, if warranted, conduct such a study.
 - Based on the above study, develop a watershed pollution abatement plan.
 - Use findings of the report to promote best management practices for individuals, businesses, and government.
- Work with the National Park Service to implement its authority under the Wild and Scenic Rivers Act to review and place appropriate conditions upon any federal permits or projects potentially affecting water quality of the Lamprey River.
- Educate riparian landowners about the river and how to keep it healthy.
 - Update the past LRAC survey to determine landowner attitudes and practices, knowledge of the river, and their priority river issues.
 - Based on the survey, create a program that features water quality, quantity, personal responsibility, management issues and best management practices.
 - Encourage landowners through an education campaign to reduce run-off on their property, minimize impervious surfaces and minimize fertilizer and pesticide use.
 - Encourage landowners, municipalities and developers to maintain vegetative buffers in order to protect the river from runoff, prevent erosion and maintain critical water temperatures for aquatic and riparian life.

- Encourage methods of returning water to the ground instead of running off the property, including using rain barrels and catchment basins.

Instream Flow



The Lamprey River below the Packers Falls Bridge. *Photo by Jerry and Marcy Monkman*

Background

The water that ultimately makes its way into the Lamprey comes from precipitation, directly via runoff, and indirectly from groundwater. On average, 20 inches per year of water comes from overland runoff. About half of this occurs during the months of March, April and May. While in some watersheds low flows in summer and fall are augmented by adjacent aquifers, the Lamprey watershed contains relatively few aquifers in direct contact with the river.

Instream flow, or the amount of water in the river at a given time, is important for several reasons

- Low water levels cause a rise in temperature with sometimes severe impacts on aquatic organisms; for example, warm water holds much less oxygen for them than cold water.
- When flows are low, any contaminants become more concentrated, which can cause wastewater treatment plants to have difficulty meeting their permit requirements.
- Very low flows cause wetlands to dry up and expose river banks, making aquatic animals more vulnerable to predation by raccoons and other predators.

- The Lamprey River provides the largest volume of fresh water compared to other sources for the Great Bay and to the Great Bay Estuary. The volume and rhythm of flow to those ecosystems are critical to their health.
- Finally, humans are affected because a low river means less recreation, poorer water quality for swimming, and shortages for municipal and commercial water supplies.

Many seacoast towns are facing a shortage of safe, reliable drinking water for their residential, commercial, industrial, and community needs. As the largest freshwater river in the Seacoast of New Hampshire, the Lamprey is viewed by many area towns as a possible source to augment their existing water supplies.

The joint UNH/Durham water system has been the largest consumptive user of the Lamprey (71 million gallons in 2004). UNH has used 70 percent of the system's water which on average produces one million gallons of water per day. The system has submitted a request to DES to increase the amount of water to be taken from the river.

Alternatives for a UNH/Durham water supply have been investigated, such as groundwater beneath the campus or the Spruce Hole aquifer, a potential major source of water for the system. However, as of 2006, plans to develop alternative water sources have not been initiated.

In addition, Newmarket is evaluating surface water withdrawals from the Lamprey River system to augment their two existing town wells and also searching for new locations for groundwater wells. The town has instituted mandatory water bans for the past two years for people on town water. The Conservation Commission has promoted water conservation by selling rain barrels and has facilitated the adoption of an ordinance that prohibits water withdrawals from surface waters along roads.

Because the Lamprey is a protected river under the NH Rivers Management and Protection Program, by statute its instream flows must be protected for the full range of human and ecological purposes. The regulations have yet to be developed, but the Lamprey is one of two rivers chosen for a pilot study of how much stream flow should be maintained, and how it should be allocated among competing uses. This involves a comprehensive study of the river's resources, from archeological sites to fish, to establish the minimum flows. The second stage is to develop a management plan to determine how to maintain those flows, regardless of the rainfall in a given year.

The pilot Lamprey Instream Flow study includes new information about both ground and surface water in the corridor, including the effect of aquifers and groundwater on recharge of the river. The use of water in both the state-designated towns of Lee and Durham and the towns upstream of them are to be

examined in the Instream Flow study. However, the study does not include towns downstream of the designated river segment, so Newmarket is excluded from the study.

Groundwater plays an integral part in planning for protection of river flows. Not only does groundwater augment surface water stream flow, but it also provides an alternative water source for human use. Knowing where and how much groundwater is available for watershed communities' use is thus intimately tied to protecting the Lamprey's flow levels. So, also, is planning for wells withdrawing water near the river, including both large withdrawals and large numbers of private wells. A U.S. Geological Survey (USGS) groundwater/aquifer study has provided new information about the location of groundwater sources in New Hampshire Seacoast towns, including the Lamprey watershed, causing some municipalities to do further work in pinpointing the location of their groundwater resources.

Accomplishments

- Worked to influence water withdrawal policies by the UNH/Durham water system, including fact-finding and campus education to promote water conservation.
- Investigated how efficiently the UNH/Durham water system is using its water resources and any potential causes of wasted water, such as leaks in the system.
- Participated in the state's Instream Flow study by gathering data, identifying important river resources to protect, and reviewing draft documents. LRAC members serve on the Technical Review Committee and the Watershed Management Planning Advisory Committee for the study.
- Worked with DES to establish minimum flows related to withdrawals from the Lamprey by the UNH/Durham water system. These minimum flow and flow recording requirements became part of the UNH/Durham 401 Water Quality Permit.
- Assisted in documenting impacts on the river when the Wiswall impoundment was drained for engineering work on the dam in 2006.

Goal

- Maintain a viable quantity of water in the river during all seasons sufficient to support and sustain the river's ecological and recreational resources, while considering the need for agricultural and municipal use.

Key Future Actions

- Encourage strategies that minimize impervious surfaces in the watershed and allow stormwater runoff to percolate into the soil, recharging groundwater that maintains river flows.
 - Encourage use of impervious surface information contained in the stream buffer study done by UNH and the New Hampshire Estuaries Project (NHEP).
- Keep water in the Lamprey watershed.
 - Communities with municipal wastewater treatment should be encouraged to return their treated wastewater to the same watershed, whether via surface waters or through land application.
 - Participate in the discussion on the legislative Regional Wastewater Study to assure that options will protect river flows in the Lamprey River watershed.
- Help ensure DES water conservation rules are applied to all new Lamprey withdrawal requests.
- Promote a DES permitting process for currently unregulated users of water from the river.
 - Investigate the potential for lowering the minimum daily quantity of water use that must be reported to DES (currently 20,000 gallons per day).
- Support municipal officials in developing long-range water plans.
 - Encourage the review of existing information about aquifers, including location of water, location of drinking water sources; build-out analyses that include water budgets; and evaluation of existing and new ordinances.
 - Promote watershed-wide water planning including limits on impervious surfaces and water budgets with projected supplies and future needs.
 - Host an annual water forum for Newmarket, Durham, Lee and Epping.
- Work with Durham to promote efficient water use, and thereby reduce need to withdraw water from the Lamprey River.
- Work with the town of Durham, DES, and USGS to develop and implement a plan to measure or estimate outflow from the Wiswall dam and inflow to the impoundment, as called for in the 401 Water Quality permit for the UNH/Durham Lamprey River withdrawal.

- Work with the National Park Service to implement its authority under the Wild and Scenic Rivers Act to review and condition federal permits or projects potentially affecting stream flow or the free-flowing character of the Lamprey River.
- Actively promote water conservation.
 - Encourage communities to consider mandatory conservation measures to augment volunteer efforts during droughts.
 - Develop homeowner incentives to conserve water.
 - Promote the use of grey water systems and drip irrigation systems.
 - Offer information to the public to help users know what their water conservation options are.
 - Encourage the UNH/Durham water system to reduce unaccounted-for water to less than 15 percent.
 - Consider partnering with UNH water conservation efforts.
- Raise awareness about water issues among community residents.
 - Use the Internet, LRAC website, public workshops, print media, an advertising campaign, and events such as road races, river rafting, geo-caching, and canoeing to focus public attention on wise use of water.
 - Consider hosting an annual river event with water quality and river flow protection as a theme.

Wildlife and Ecology



Painted turtle emerging from the Lamprey. *Photo by Richard H. Lord.*

Background

The Lamprey River drains an increasingly populous watershed of 212 square miles, the largest watershed and the longest tributary to the Great Bay Estuary, a National Estuarine Research Reserve. This largely forested and relatively undeveloped river corridor supports important floodplain forests, extensive shrub and emergent marsh wetlands, and scattered openings and fields among the forested uplands. The floodplains, backwaters, vernal pools, fields, and forests are home to a great diversity of wildlife including significant populations of Blanding's, spotted, and wood turtles, species of conservation concern in New Hampshire.

Six of the nine riverine freshwater mussels known to occur in New Hampshire, including the state-endangered brook floater, are found in the Lamprey River. The Lamprey is one of the state's most significant rivers for anadromous fish such as river herring and American shad, as well as many freshwater fish. More than 150 species of birds breed or winter along the river corridor, or stop over during migration. In addition, the Lamprey supports the ecosystem of the Great Bay Estuary by providing fresh water and habitat for the many species found there.

Compared to other rivers in the region, the lower Lamprey River's channel, floodplain and adjacent wetlands are still relatively intact, making possible the wide range of plants, fish, and other wildlife that live here. Their persistence depends on maintaining water quality, flow patterns, riparian vegetation, and unfragmented uplands. Intact riparian areas (buffers) and associated wetlands help protect the river from soil erosion and sediments, excessive nutrients, pollutants, and over-heating in summer sun, as well as slowing the flow of seasonal or storm flood waters. Several key management challenges affect the ecological integrity of the river corridor. These include increasing development, invasive species, fish restoration and passage upriver, habitat fragmentation, water withdrawals, and stormwater, sediment, and nutrient runoff into the river.

The ecology of the Lamprey, as summarized above, was found by the National Park Service to represent an "outstandingly remarkable" resource value worthy of recognition and protection through the Wild and Scenic Rivers System (1995 *Draft Report to Congress*).

Accomplishments

- Sponsored research and surveys along the river on amphibians, reptiles (especially turtles), birds, mammals, mussels, plants and plant communities, floodplains, vernal pools, and river characteristics in the four towns. This research helped to determine land protection priorities, and provided information pertinent to review of proposed developments. The LRAC's research also is useful to the Instream Flow study, LRAC's education and outreach activities, and helps track the ecological health of the river corridor.
- Worked with NH Fish and Game and the US Fish and Wildlife Service to plan and advocate for fish passage at the Wiswall Dam in Durham, which would open 47 miles of aquatic habitat for migrating fish. LRAC disseminated public information about the project through mailings and public hearings. Alternatives continue to be evaluated.

Goals

- Work with and build upon existing inventories and conservation plans that encompass the Lamprey River watershed.
- Restore and protect the ecological functions and values of the lower Lamprey River watershed that are critical to wildlife and humans.

Key Future Actions

- Compile and further analyze the findings of the plant, wildlife, and other ecological studies done by the LRAC and others within the Wild and Scenic designated area within the past 15 years.
- Work with others to insure an up-to-date natural resource inventory including updated GIS maps of key resources (e.g., habitat) and problems (e.g., invasive species) within the lower four towns.
 - Continue to identify important wildlife use areas, travel corridors, and unfragmented lands and work with appropriate partners toward protection of these areas.
- Work with DES to explore the undertaking of a “Tiered Aquatic Life Use” classification system to characterize the ecological health of the river, segment by segment.
- Based on the analysis in the preceding action items and in consultation with NH Fish and Game (and its *New Hampshire Wildlife Action Plan*), UNH, Great Bay Resource Protection Partnership, NH Coastal Program (and its *Land Conservation Plan for New Hampshire’s Coastal Watersheds*), and other conservation partners, identify the highest priority research and inventory projects that will lead to greater understanding and long-term protection of the ecological values of the Lamprey River.
 - Create an internal document that divides the river into segments and places available information into a user-friendly computer program, with files where information can be stored.
- Work to eradicate invasive species.
 - Inventory the occurrence of invasive species in the lower Lamprey River corridor and develop management strategies including educational materials to prevent and control invasives.
 - Continue efforts to eradicate the large population of Japanese knotweed at Wadleigh Falls.
- Continue to work with NH Fish and Game and the Town of Durham on providing fish passage at the Wiswall dam area.
 - Work with NH Fish and Game to identify suitable areas for native trout habitat, and manage for trout survival.
- Develop a 10-year monitoring program, including the metrics to monitor and assess our collective progress in protecting the ecological integrity of the river and its watershed.

- As part of the overall LRAC outreach program, identify key audiences and develop targeted materials and programs that highlight the ecological significance of the river and opportunities to conserve these resources.
- Partner with conservation groups, UNH, town governments, and others to conduct educational programs that inform riparian landowners, recreational users, and the general public of the importance of conserving wildlife and their habitats. Activities may include:
 - Forums and programs related to riparian buffer areas and river stewardship practices that conserve wildlife habitats and ecological functions of the river.
 - A river stewardship display for libraries and events that include “take away” information for the public which emphasize “tread lightly” policies.
 - Newspaper columns, press releases, television spots, and town newsletters.
 - Public events such as nature walks and canoe trips, in partnership with local watershed organizations such as the Lamprey River and Oyster River watershed associations, town conservation commissions, and land trusts.
- Assist the four town governments in updating and creating policies, regulations, and programs that protect sensitive wildlife habitats, reduce habitat fragmentation, and conserve river functions such as flood and erosion control, nutrient uptake, and temperature regulation. This includes:
 - Encourage the four towns to establish setback standards that protect the river. Work to extend this standard throughout the watershed in partnership with town boards and other conservation organizations.
 - Ensure that development within the corridor occurs in a way that protects rivers and adjacent sensitive areas and minimizes habitat fragmentation. Encourage towns to adopt measures such as clustering away from the river, perhaps with incentives such as density bonuses.
 - Continue to review and comment on all development proposals that have an impact on the river ecosystem, in concert with appropriate conservation commissions and planning boards (a statutory responsibility of the LRAC).
 - Provide input to the state’s Lamprey River Instream Flow Study relative to protection of ecological resources through good stream flow management.
 - Continue to work with the New Hampshire Department of Transportation to assure that highway and bridge construction

projects are carried out in a way that minimizes impacts to the river's flora, fauna, and water quality.

- Continue to inform and work with interested landowners who have areas identified as ecologically sensitive or important, to encourage and assist them in determining and implementing specific protection and stewardship measures (such as conservation easements). Facilitate partnerships with towns and other organizations to implement the protection measures.
- Continue to focus on instream flow issues, including maintaining an ecologically healthy flow to feed Great Bay and the Great Bay Estuary.

Land Protection



The Lamprey River Advisory Committee touring land protected by a conservation easement at the Verette property on the Lamprey River. *Photo by Richard H. Lord.*

Background

The most effective long-term strategy for conserving the river is voluntary land protection, either by a conservation easement or land acquisition by a municipality or conservation group. Other tools for protecting the significant natural resources of the Lamprey River watershed have notable limitations. Regulatory approaches (such as shoreland protection rules) provide minimum, yet important, protection to the river; voluntary resource stewardship by individual landowners often varies from one owner to the next, and is not as durable, over the long term, as a conservation easement.

A conservation easement is a legal agreement between a landowner and a conservation organization or agency in the form of a deed that permanently protects the land from development. Conservation easements are granted in perpetuity and apply to the land regardless of who may own it in the future. Land under easement often remains privately owned and managed. Typically, it

is used for agriculture, forestry, wildlife habitat, scenic views, watershed protection, passive recreation and education. All uses not specifically prohibited by the easement are allowed to continue provided they are compatible with the conservation purposes of the easement. The land trust or municipality that holds the easement is obligated to monitor it annually to assure that the easement terms are being adhered to, and enforcing its terms, if necessary.

The LRAC partners with towns, state agencies, and land trusts on land protection projects. The committee is not organizationally structured to hold either title to land or conservation easements. Instead, it provides information and assistance to landowners about the natural resource values of their property and ways to conserve their property if they are interested. The committee provides funds to cover some land transaction costs such as appraisals and surveys, and provides funds to cover a portion of the land acquisition costs.

It is LRAC's policy is to match or leverage its funds with those of other conservation groups to further the collective conservation goals of communities, landowners, and environmental protection partners. Since LRAC land protection funds are provided by Congress, this policy also assures Washington that federal dollars are being leveraged at the local level. Expenditure of these funds is subject to the conditions of the 1995 *Lamprey River Management Plan*, which was referenced in the federal designating legislation. The pertinent language in this regard is as follows:

The National Park Service will not own or manage any lands along the river and does not support condemnation of land along the river. Federal funds can be made available to land trusts and local communities for the purchase of lands or conservation easements that advance the purposes for which the river was designated (particularly ecological, archaeological, and fisheries protection). The National Park Service considers providing funds subject to the following conditions:

- *The acquisition is from willing sellers only;*
- *Local municipal authorities approve the acquisition, and;*
- *An appropriate local, state, or nonprofit entity and not the National Park Service holds title and management responsibility for any purchased lands or easements.*

The LRAC has developed a set of criteria for prioritizing lands for conservation. In addition to these priorities, each property is evaluated for its unique qualities.

- First Priorities
 - Land with at least 1,000 feet of river frontage
 - Properties on which easements can be placed on the entire property
 - Properties which are threatened by development

- Properties whose owners are ready to take steps to conserve the land, or whose circumstances require resolution of the land's future
- Properties with special features: soils, open space, cultural/historic features
- Properties which have significant wildlife habitat
- Properties currently being used as productive open space, e.g., farming, forestry, etc.
- Second Priorities
 - Properties with at least 500 feet of river frontage
 - Properties on which buffers 500 feet deep from the river bank can be placed
 - Properties offering recreational access to the river
 - First priority land whose owners are reluctant to take action imminently
 - Land which connects to other conservation lands
 - Land which is part of a large, unfragmented block of undeveloped land
- Third Priorities
 - Land which must be purchased outright (as opposed to easements)
 - Parcels smaller than five acres
 - Parcels with less than 500 feet of river frontage
 - Properties on which river buffers of less than 500 feet are proposed
 - Parcels deemed to be largely undevelopable

Committee volunteers and land protection staff work with towns and partner organizations to contact owners of high priority properties. Property owners are urged to communicate with any of these to explore conservation options before making decisions to develop their land. The LRAC cannot pay more than the full appraised value for a property. Landowners may also choose to donate all or part (a bargain sale) of the property or easement value.

LRAC's land protection effort has been a great success. In 1999, Paul and Mary Verrette of Lee signed the first conservation easement agreement. By November 2007, twenty properties with more than seven and a half miles of riverfront land and 1,072 acres have been preserved. These include all the river's important habitat types: farmland, floodplain and upland forest, wetlands, and riparian habitat along the river and its tributaries.

Accomplishments

- \$1,862,500 spent to acquire conservation easements and/or fee title to properties along the river. These federal dollars have been highly leveraged through landowner donations of land value and matching funds from towns and conservation organizations. Each federal dollar expended has been matched by two non-federal dollars in cash or donated land.
- 20 properties, totaling 1,072 acres, and over 7 ½ miles of river frontage have been conserved.

Goals:

- Protect significant lands along the Lamprey and adjacent areas that support the ecological health of the river and its tributaries.
- Continue to work with municipalities and landowners to foster landowner interest in permanent conservation of lands within the Lamprey River corridor.

Key Future Actions

- Continue to contact owners of high priority lands to inform them of conservation options.
- Raise the level of awareness of the importance of land conservation in this rapidly-growing part of the state.
- Continue to support research on the resource values of the Lamprey River corridor to identify key lands to protect. This includes inventories of rare wildlife and plants, important agricultural soils, sensitive or otherwise important habitats, and recreational assets.
- Work with partners to take advantage of funding opportunities, such as government programs, private fundraising, wetland mitigation funds, and municipal sources such as current use change tax funds or bonds.
- Review the *New Hampshire Wildlife Action Plan* and *The Land Conservation Plan for New Hampshire's Coastal Watersheds* to help identify lands for protection.

The following map, "Conserved Lands in the Lower Lamprey River Watershed," prepared by Strafford Regional Planning Commission, shows all conserved and/or public lands in the area of Epping, Lee, Durham, and

Newmarket. Projects for which LRAC provided financial or technical assistance are highlighted.

History and Archaeology

Background

Identified human activity along the Lamprey began about 8,000 years ago with a site used seasonally by Native Americans, which has been identified and documented by University of New Hampshire archaeologists. European settlers were drawn to the river as an energy source, and mills were located there as early as the 1650s. Timber, flour, cloth, paper, wallpaper, leatherboard, shoes, and agricultural tools made of iron were manufactured over the years at these mills to supply local and regional needs. The largest mill was the Newmarket Manufacturing Company, founded in 1822, which at one time contained the largest weaving room in the world.

More than 30 historical sites were listed on the Historical Resources Map in the *Lamprey River Resource Assessment* (1994) with two being designated on the National Register of Historic Places (Wiswall Dam area and 41 buildings in the mill district of Newmarket). Hotels, camps, bridges, railroads, churches, and homesteads are all indicated on the map as well as in several historical publications. The National Park Service's 1995 *Draft Report to Congress* cited the archaeological values of the Lamprey as an "outstandingly remarkable" resource value warranting recognition and protection through the Wild and Scenic River designation.

While the Lamprey River Advisory Committee has created a curriculum and a historical fiction book, little has been done to more thoroughly research and teach about significant sites along the river. History is a very important component of a "sense of place." Understanding the history of the Lamprey River is a necessary part of landowner and public appreciation of the river. It becomes even more important as newcomers settle in the communities along the river.

Accomplishments

- At Wiswall dam, the National Park Service funded restoration of the walls of the original mill race, and the LRAC worked with an Eagle Scout who cleared vegetation from an old mill foundation and erected an interpretive panel about the site's history.
- A documentary video, *The Lamprey Through History*, was created and distributed. The video describes historic sites and activities for the entire length of the river.
- An elementary, middle and upper school curriculum focused on the Lamprey, including its history, was created and passed along for active use in area schools.

- Produced a children's book entitled *The Story of Peter Little Bear, A Lamprey River Adventure*, describing life along the Lamprey through the eyes of Native Americans.

Goal

- Continue to research and make accessible to the public the history of the Lamprey River to encourage a deeper appreciation of the river's sense of place.

Key Future Actions

- Continue to enlist volunteers and secure funding for professional research on the Lamprey's history and archaeology.
 - Identify at least one site in each town to research and document including photographs that can be stored electronically and shared with the National Park Service, NH Division of Historical Resources, the University of New Hampshire, local and state historical societies, and community organizations and schools. Priority projects include:
 - Historical resources at Packers Falls, including the Lamprey Iron Works.
 - The Oxway Road from the Macallen Dam in Newmarket to Wadleigh Falls in Lee.
 - Study of the colonial era history and a more complete archaeological study of the Native American site near Wadleigh Falls.
- Identify, evaluate, and help to protect publicly and privately owned land with high historic or archaeological value.
- Protect historic and archaeological resources on a site-specific basis, with techniques ranging from acquisition to protection from human impacts.
 - Include protection of historical/archeological resources appropriately in land protection projects of the LRAC.
 - Work with property owners to promote follow-up investigation of artifacts or historical features that they have discovered, and promote stewardship of these features.
 - Utilize permit review responsibilities to encourage protection of known or suspected sites.
- Provide for permanent protection of irreplaceable historical documents pertaining to the river.

- Assist communities in retaining historical information locally with archival copies at the State Library or other appropriate repositories.
- Use historical and archaeological information to promote “a sense of place” among residents of the four towns and the watershed.
 - Partner with local and state organizations to produce materials such as historical markers at important sites such as Wadleigh Falls and Highland House.
 - Complete Wiswall Park, developing a trail system and a kiosk whose contents showcase the historical and ecological importance of the site.
 - Continue efforts to inform educators and provide materials for them to use with their students.
 - Use media when appropriate to inform the public of interesting and important historical/archeological information that promotes appreciation of the river.

Recreation



The Executive Board of American Rivers, canoeing the Lamprey River, just below Wadleigh Falls, during the increased flows of fall. *Photo by Richard H. Lord.*

Background

People are always drawn to a river. The Lamprey River is clean, beautiful and relatively undeveloped, and people fish, swim, boat, and walk along its banks. When people are able to access and enjoy the river, they come to love and appreciate it, and are inspired to protect it. It is with this in mind that LRAC seeks to improve non-motorized recreational access to the river, in a way that respects all other valued aspects of the river, such as water quality and wildlife habitat.

Accomplishments

- In collaboration with the Public Works Department of Durham, created a public historic park at Wiswall dam, including a parking lot and fenced picnic area.

- In cooperation with a NH Department of Transportation bridge project, created a park and riverside trail at the Route 87 bridge in Epping. The site provides parking near the river and a ramp for hand-carried boats. LRAC and the Epping Conservation Commission created an informational kiosk. Pamphlets guide visitors along marked points of interest on the trail, providing information on the important characteristics of floodplains.
- In cooperation with the Town of Newmarket, initiated marine patrol on the river near the Newmarket boat launch to control speeding power boats that can conflict with non-motorized uses on the river and can cause bank erosion due to large wakes.

Goal

- Improve and increase non-motorized recreational opportunities on and along the Lamprey River in the four LRAC towns.

Key Future Actions

- Develop a plan and recreation tour along the river.
 - Inventory and map existing recreational facilities/use (consult recreation survey conducted by UNH students).
 - With partners in each town (e.g., conservation commissions, recreation commissions, land trusts, landowners, state agencies), identify recreational opportunities and ideas, as well as sensitive or non-accessible areas.
 - Consider the compatibility of different recreational uses on and along the river (motorized, non-motorized, hunting, bikes, etc.).
 - Consider walking trails, water trails and hand-carry boat access, canoe campsites, wildlife viewing areas, informational kiosks and brochures, maps, self-guided tours, and bike routes.
 - Create a draft recreation plan in the form of a map.
 - The recreation plan may include improvement of existing river recreation facilities, with LRAC assisting partners in improving/managing existing facilities.
 - Establish any necessary guidelines for the plan, such as minimizing signs to avoid visual pollution and protecting ecological values.
- Begin implementing the recreation plan and tour.
 - Implement the highest priority and most ready-to-go recreation improvements.
 - Establish any necessary site specific management guidelines such as seasonal closure to protect sensitive areas.
 - Acquire any necessary permits or permissions.

- Work with partners to build recreational facilities.
- Produce any information which may be part of new facilities, such as maps, brochures, and signs.
- With partners, agree upon and undertake maintenance responsibilities.
- Create a guidebook for the recreation tour.
- Sponsor recreational events.
 - Consider events such as fishing demonstrations, plant identification walks, bird walks, canoe trips and demonstrations, clean-ups, etc.
 - Plan one event per season.
 - Invite partners to co-sponsor events.
 - Publicize the events to attract participation.
 - Consider using all events to educate participants about the river and “tread lightly” principles.
- Post the recreation plan and tour to the website, including maps, directions, use guidelines, etc.

Project Review and Comment



Wildlife underpass built into the reconstructed Route 87 Bridge over the Lamprey River as recommended by the Lamprey River Advisory Committee. *Photo by Richard H. Lord.*

Background

The Lamprey River Advisory Committee is charged through its state charter with commenting upon State of New Hampshire permits and projects that could impact the protected river or its values. Similarly, the committee is advisory to the National Park Service relative to the federal Wild and Scenic River designation, with a goal of protecting and enhancing the river where federal permits or projects are concerned. The committee is also a local advocate and reviewer for town-level actions and permits. The LRAC is “the voice of the river” in these processes, with state and federal legislative charters to back that voice and ensure that it is heard.

Accomplishments

- LRAC has reviewed and commented upon:
 - A major golf course proposed for 2.5 miles of riverfront in Durham. Comments focused on protection of a riparian buffer, minimizing wetland and floodplain degradation, and water quality monitoring (proposal withdrawn).

- Various house lots along the river.
- A potential hydroelectric facility in Newmarket (proposal withdrawn).
- Improvements to Packers Falls Bridge. LRAC contributed \$15,000 towards the bridge reconstruction which replaced massive concrete railings with metal railings that permit views of the river.
- The proposed Wiswall dam fish passage.
- Improvements to the Newmarket boat launch.
- The Lamprey River water transmission main line. Resulted in a Clean Water Act, Section 401 permit to allow the Town of Durham increased municipal water usage while protecting Lamprey River habitat and flows.
- A system for monitoring and controlling power boat speeds on the lower Lamprey.
- Reconstruction of Route 87 bridge. First time NHDOT has hired a soil-bioengineering firm to design state-of-the-art streambank stabilization. Also wildlife underpass, floodplain conservation easement, and access improvements.
- Commercial development at Routes 101 and 125 in the river corridor.
- The Town of Durham's proposed shoreland and wetland ordinances.
- A large Epping subdivision. LRAC and NPS brought local, state and federal reviewers together to re-design the project in an "open space" design. Led to adoption of Epping's "Open Space" subdivision ordinance.
- Revisions to the New Hampshire Comprehensive Shoreland Protection Act.

Goal

- Ensure that river protection goals are adequately considered during project design and review at local, state and federal levels.

Key Future Actions

- Formalize a communications process between the towns, state and federal agencies, and LRAC to provide for timely notification of permit applications for local projects.
- Review and comment on all local, state and federal permits and projects that have the potential to affect water quality, stream flow, and other river values.

- Participate when possible in project design meetings, studies, and similar preliminary processes that could lead to actions, projects, or permits related to the river and its values.
- Provide comments on proposed legislation affecting the river.

Outreach and Public Education



The Lamprey River Advisory Committee often attends local fairs to educate people about matters related to the Lamprey Wild and Scenic River designation. *Photo by Richard H. Lord.*

Background

One of LRAC's more important contributions over the past ten years has been in educating the public about the values of the Lamprey River and its watershed. Our educational efforts have emphasized the natural resources of the river itself and its surrounding lands, its historic and archaeological resources, its scenic beauty, and its recreational potential. Creating a better understanding of these values has generated public pride and a sense of appreciation and stewardship. Building on these positive feelings, LRAC has also helped the public understand actions that they can take to preserve and protect the river and its watershed.

Another component of the educational effort has been to explain the status of the river in the federal Wild and Scenic Rivers Program and the NH Rivers Management and Protection Program, and the role of the LRAC in both programs. Since some upstream communities have indicated an interest in

achieving protection under both the state and federal programs, the LRAC can offer their support of these efforts.

It is often said that “the committee speaks for the river.” The process of “speaking” in the past ten years has made use of brochures, videos, public displays, books, workshops, teaching guides, etc. In the future, we will continue our use of traditional media, yet be prepared to utilize some of the more advanced and widely available communications technologies.

Accomplishments

- Produced a publication entitled *The Lamprey River, Watershed Guide*, profiling each town and its relationship to the river.
- Created a LRAC website: www.lampreyriver.org.
- Created a brochure entitled *The Lamprey River, A Special Place*, describing the Lamprey, its status under the federal Wild and Scenic River Program, and the work of the LRAC.
- Created a brochure entitled *Living on the Lamprey*, offering a riverfront landowner’s guide for protecting, preserving, and nurturing the river.
- Created a video entitled *River Story, The Lamprey Through History*, outlining the important role of the river in supporting and nourishing human endeavor since the dawn of man’s presence.
- Created a guide entitled *The Lamprey River Curriculum*, for use by elementary, middle, and high school teachers. The aim of the guide is to assist students in studying the river as a vital part of their cultural heritage.
- Produced a children’s book entitled *The Story of Peter Little Bear, A Lamprey River Adventure*, describing life along the Lamprey through the eyes of Native Americans.
- Developed a portable display promoting the Lamprey as a Wild and Scenic River and highlighting informational documents and media listed above. The display has appeared at numerous local events within the four towns.
- Conducted informational workshops on such topics as stewardship of riverfront lands, water quality, wildlife along the river, and conservation easements.

- Constructed informational kiosks and produced pamphlets for users of river access points in Epping and Durham (see “Recreation” above).
- Posted signs at bridges in all four towns announcing the Wild and Scenic status of the river.
- Helped re-invigorate the Lamprey River Watershed Association, in order to support protection of contributing upstream watershed areas, through matching grants and information exchanges.

Goal

- Cultivate stewardship and appreciation for the river by informing and educating the public.

Key Future Actions

- Revitalize and actively maintain the website of the Lamprey River Advisory Committee at www.lampreyriver.org.
- Convert the video, *River Story, The Lamprey Through History*, to DVD format.
- Develop a logo and letterhead for the Lamprey River Advisory Committee.
- Update the LRAC display with focus on Committee specializations, i.e., water, wildlife, land protection, outreach, recreation, and history.
- Update and reprint the two informational brochures, *The Lamprey River, A Special Place* and *Living on the Lamprey*.
- Assist the LRWA in its efforts to gain the necessary public support for designation of upstream entities into the NH Rivers Management and Protection Program and the Wild and Scenic Rivers program.
- Partner with various organizations, such as schools, libraries, historical societies, UNH Extension, etc., to teach people about the river:
 - Continue to promote and distribute the book, *The Story of Peter Little Bear, A Lamprey River Adventure*.
 - Develop both large scale and hand-out maps displaying protected lands along the Lamprey River.
 - Continue to sponsor informational forums and workshops (in association with other partners) on such topics as impervious surface impact, shore land buffers, land protection tools, shore land stewardship, critical habitat protection, and water quality.

- Continue to plan and sponsor public events along the Lamprey that enhance the public's appreciation of the river, e.g., land protection celebration, canoe trips, and river cleanups.

Definitions

Class B Waters – Of the second highest quality, these waters are considered acceptable for fishing, swimming and other recreational purposes, and, after adequate treatment, for use as water supplies. DES has numeric and narrative criteria for these uses. Antidegradation provisions also apply (See NH RSA 485-A:8).

Conservation easement – A legal agreement between a landowner and a conservation organization or agency in the form of a deed that permanently protects the land from development.

Density bonus – An increase in the amount of development (number of units) allowed by a town on a parcel of land in exchange for a developer's modifying the development plans to include public benefits.

Grey water – Wastewater other than sewage, usually from laundry and washing dishes.

Habitat fragmentation – The division of habitat into smaller and less productive pieces, usually by the construction of roads or other barriers to certain wildlife.

Impervious surface – Surfaces on the land, such as pavement or roofs, that prevent the natural infiltration into the soil of precipitation, thus increasing runoff.

Invasive species – Non-native plants or animals that are particularly aggressive in out-competing native species, thereby degrading habitat for resident species.

Pervious surface – Land surfaces that allow precipitation to infiltrate into the soil, e.g., forests, fields, lawns, unpaved driveways, etc.

Riparian – Relating to or located on or near the banks of a natural watercourse.

Runoff – That portion of precipitation that does not infiltrate the soil but runs directly off the land into surface waters.

Tertiary treatment – Advanced wastewater treatment usually aimed at nutrient removal.

Vernal pool – Seasonal pool of water critical to the survival of certain species.

Watershed – The geographic area that drains into a river directly or via tributaries.

Programs and Abbreviations

DES – New Hampshire Department of Environmental Services

GIS – Geographic information system, a computer-support system for mapping and mapping-related data.

LRAC – Lamprey River Advisory Committee

LRWA – Lamprey River Watershed Association

NERR – National Estuarine Research Reserve

NHEP – New Hampshire Estuaries Project

NPS – National Park Service

NRCS – Natural Resource Conservation Service

RMPP – NH Rivers Management and Protection Program

UNH – University of New Hampshire

USGS – U.S. Geologic Survey

VRAP – NH State Volunteer River Assessment Program

Wild and Scenic River – National system of outstanding rivers into which individual rivers are designated by US Congressional action.

401 Water Quality Permit – permit allowing the discharge of water into a waterbody, under Section 401 of the Clean Water Act.

Bibliography

Allan, David and Hamilton, Leslie, illustrated by David Allan and Amy Daskal, *The Story of Peter Little Bear, A Lamprey River Adventure*, published by Publishing Works, Exeter, New Hampshire, 2005.

Fosburgh, Jamie, and the Partnership Rivers Group, “Wild and Scenic Rivers ‘Eastern Style.’” River Management Society Newsletter, Summer 2006.

Justice, David, and Rubin, Fay, *Stream Buffer Characterization Study*, the University of New Hampshire, and the New Hampshire Estuaries Project, Durham, NH, 2006.

Lamprey River Advisory Committee, *Lamprey River Management Plan*, 1995 (now available at www.lampreyriver.org).

Lamprey River Advisory Committee, *Living on the Lamprey, A Landowner’s Guide to Protecting, Preserving, and Nurturing Your River*, 2002 (brochure).

Lamprey River Advisory Committee, *River Story, The Lamprey Through History*, created by Ideaworks, 1999 (video).

Lamprey River Advisory Committee, *The Lamprey River, A Special Place*, (brochure).

Lamprey River Advisory Committee and Lamprey River Watershed Association; edited by Cynthia Lay, *The Lamprey River Watershed Guide*. *Foster’s Daily Democrat*, Dover, NH., 1997 (newspaper supplement).

McNelly, Deborah, Hoff, Douglas, and Rous, Emma L.; edited by Sharon Meeker, Sea Grant Extension and Cooperative Extension, University of New Hampshire; in collaboration with Lamprey River Advisory Committee, Lamprey River Watershed Association, The Greater Piscataqua Community Foundation and the Barbara K. and Cyrus B. Sweet III Fund, *The Lamprey River Curriculum*, December 2000.

National Park Service, *Lamprey Wild and Scenic River Study: Draft Report to Congress*, June, 1995.

New Hampshire Estuaries Project, *Management Plan*, 2000, April 2000.

New Hampshire Estuaries Project, *Management Plan*, 2005 Update, June 2005.

New Hampshire Fish and Game Department, *New Hampshire Wildlife Action Plan*, 2005.

U.S. Geological Survey, *New Hampshire Seacoast Groundwater Availability Assessment Project*, 2003-2007.

Watkins, Margaret, *Lamprey River Resource Assessment*, published by Lamprey River Advisory Committee, 1994.

Zankel, M., C. Copeland, P. Ingraham, J. Robinson, C. Sinnott, D. Sundquist, T. Walker,

and J. Alford, *The Land Conservation Plan for New Hampshire's Coastal Watersheds*, The Nature Conservancy, Society for the Protection of New Hampshire Forests, Rockingham Planning Commission, Strafford Regional Planning Commission. Prepared for the New Hampshire Coastal Program and the New Hampshire Estuaries Project. Concord, NH, 2006.

Reviewers

Prior to the adoption of this Management Plan update by the Lamprey River Advisory Committee, it was distributed for review to the following parties:

- New Hampshire Department of Environmental Services
 - Steve Couture
 - Natalie Landry
 - Laura Weit
 - Phil Trowbridge

- Town of Durham
 - Town Council
 - Planning Board
 - Conservation Commission

- Town of Epping
 - Board of Selectmen
 - Planning Board
 - Conservation Commission

- Town of Lee
 - Board of Selectmen
 - Planning Board
 - Conservation Commission

- Town of Newmarket
 - Town Council
 - Planning Board
 - Conservation Commission

- US Dept. of Interior, National Park Service
 - Jamie Fosburgh
 - Julie Isbill

- Lamprey River Watershed Association



Photo by Jerry and Marcy Monkman.